

What is claimed is:

1. A linear motor comprising:
 - (a) an outer yoke forming a fixed section of the linear motor and including:
 - (a-1) a laminated core formed by laminating thin magnetic plates, each one of the plates having a plurality of slots;
 - (a-2) a coil wound in the plurality of slots wherein supply of an electric current through the coil produces at least three magnetic poles on a surface of the outer yoke,
 - (b) an inner yoke facing the outer yoke at a given gap in between and including:
 - (b-1) a laminated core formed by laminating thin magnetic plates;
 - (b-2) a permanent magnet rigidly stuck to the laminated core of the inner yoke, and
 - (c) an output shaft, wherein the inner yoke is rigidly mounted to the output shaft and forms a movable section of the linear motor.
2. The linear motor of claim 1, wherein the permanent magnet shapes in a flat-plate.
3. The linear motor of claim 1, wherein at least two linear-motor assemblies are disposed at an equal angle around the output shaft commonly shared by the assemblies.
4. The linear motor of claim 1, wherein at least one of the output shaft and the fixed section, which contacts the outer yoke, of the linear motor is made of non-magnetic material.

5. A linear-motor based compressor comprising:

(i) a linear motor including:

(a) an outer yoke forming a fixed section of the linear motor and including:

(a-1) a laminated core formed by laminating thin magnetic plates, each one

5 of the plates having a plurality of slots;

(a-2) a coil wound in the plurality of slots

wherein supply of an electric current through the coil produces at least three magnetic poles on a surface of the outer yoke,

(b) an inner yoke facing the outer yoke at a given gap in between and

10 including:

(b-1) a laminated core formed by laminating thin magnetic plates;

(b-2) a permanent magnet rigidly stuck to the laminated core of the inner yoke, and

(c) an output shaft,

15 wherein the inner yoke is rigidly mounted to the output shaft and forms a movable section of the linear motor.

(ii) a compressor mechanism including a cylinder and a piston, wherein the cylinder is mounted to the fixed section of the linear motor and forms a fixed section of the linear-motor based compressor, and the piston is linked to the output shaft of the linear motor 20 and forms a movable section of the linear-motor based compressor;

(iii) a resonant spring disposed between the fixed section and the movable section of the linear-motor based compressor,

wherein the linear-motor based compressor is driven by a frequency around a resonance frequency that is determined by masses of the fixed section and the movable section 25 of the linear-motor based compressor and a spring constant of the resonant spring.